

New records of weevils (Coleoptera: Curculionoidea) from Mona Island, Puerto Rico

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ABSTRACT. An inventory of the weevil fauna of Mona Island, Puerto Rico, is provided. Sixteen new records and 5-9 new species are reported, yielding a total of 28 species of Curculionoidea for the island. The distribution and natural history of each species are briefly reviewed. As many as nine species are endemics, whereas 15 species are shared with Puerto Rico which was the primary source region for Pliocene-Pleistocene colonization events. Mona Island's weevil fauna is depauperate and dominated by members of the Cossoninae, Anthonomini, Tychiini, Entiminae, and Scolytinae. The apparent underrepresentation of common Caribbean weevil lineages such as the Cryptorhynchinae suggests that subaerial land bridges during the Oligocene-Miocene period were important in facilitating their colonization of the main island of Puerto Rico.

Key words: beetles, biodiversity, biogeography, Caribbean, colonization, endemism, natural history, new species, new records, Mona island.

RESUMEN. Se provee un inventario de la fauna de picudos de la Isla de Mona, Puerto Rico. Se citan 16 registros nuevos y 5-9 especies nuevas, sumándose a un total de 28 especies de Curculionoidea para la isla. Se resume brevemente la distribución e historia natural de cada especie. Nueve especies son endémicas, mientras que 15 especies son compartidas con Puerto Rico, la fuente regional primaria para eventos de colonización en el Plioceno-Pleistoceno. La fauna de picudos de la Isla de Mona esta empobrecida y dominada por miembros de los taxones Cossininae, Anthonomini, Tychiini, Entiminae y Scolytinae. La aparente subrepresentación de linajes comunes de picudos Caribeños como los miembros de Cryptorhynchinae sugiere que la presencia de puentes de tierra subaéreos durante el período Oligoceno-Mioceno fueron importantes en facilitar su colonización desde Puerto Rico.

Palabras clave: biodiversidad, biogeografía, colonización, endemismo, escarabajos, especies nuevas, registros nuevos, historia natural, isla de Mona, Caribe.

INTRODUCTION

Mona Island is located in the Mona Passage of the Caribbean archipelago (18°15' N, 67°33' W), approximately 60 km east of Hispaniola and 68 km west of Puerto Rico. The island forms a kidney-shaped, uplifted carbonate plateau with an area of 57 km² and a maximum elevation of 100 m. The near-vertical cliffs bound a flat-topped *meseta* consisting of Isla de Mona Dolomite overlaid with Lirio Limestone (Frank *et al.*, 1998). According to González *et al.* (1997), this platform rose above sea level during the late Miocene or early Pliocene (i.e., 5-7 million years ago), thus making it one of the youngest unconnected "stepping stone" islands in the Greater Antilles. The climate is semi-arid and the perforated limestone and reddish clay sustain a xerophytic, dry subtropical forest with some 400 species of vascular plants (Woodbury *et al.*, 1977, Cintrón and Rogers, 1991). Mona Island has no permanent settlements and is presently being managed by the Puerto Rican Department of Natural and Environmental Resources (DRNA; see <http://www.drna.gobierno.pr/>). It has a history of relatively little human activity (Wadsworth, 1973), and therefore constitutes a rare natural laboratory for ecological and evolutionary studies (Cintrón, 1991, Smith *et al.*, 1994, Genaro and Franz, 2008).

Sporadic records of insects occurring on Mona Island were published since the early 20th century (e.g. Schwarz, 1902). A more in-depth survey was conducted in 1914 by members of the *Scientific Survey of Porto Rico and the Virgin Islands* project (Maldonado Capriles, 1996), followed by repeated collecting excursions by University of Puerto Rico at Mayagüez entomologists Stuart Danforth and José Ramos in the 1930s-1940s (Franz and Yusseff Vanegas, 2009). Their efforts culminated in Ramos' (1946) treatment of the insects of Mona Island, in which he reported 526 insect species overall and 123 species in the Coleoptera. More than 60 years later, this work remains the most comprehensive account for much of the island's beetle fauna, including the weevils (Curculionoidea) where he reported a total of 10 species (Ramos, 1946: 43-44).

In 2008 the senior author visited Mona Island and collected 146 'morphospecies' of Coleoptera (cf. Krell, 2004). Approximately half of these species could be assigned with confidence to species listed in Ramos (1946), suggesting that dozens of the island's beetle species remain undocumented or even undescribed. Here we provide a taxonomic update of the Curculionoidea of Mona Island, increasing the number of recorded species to 28, and providing locality and natural history notes where available. We discuss the implications of these occurrences in light of modern reconstructions of West Indian biogeography.

MATERIALS AND METHODS

The collecting period extended from May 18-24, 2008, and concentrated on six principle localities (Fig. 1): (1) Bajura Los Cerezos (18°05'48" N, 18°53'53" W; 40-50 m), depression forest; (2) Playa and Sendero Carabinero (18°04'06" N, 18°55'33" W; 0-5 m), coastal lowland forest with open and closed canopy, casuarina and mahogany plantations, and successional habitats; (3) Playa Pájaros (18°03'49" N, 18°52'12" W; 0-35 m), coastal shrub forest, coastal lowland forest with open canopy, cliffside forest, and plateau forest;

(4) Playa Sardinera (18°05'12" N, 18°56'18" W; 0-20 m), coastal shrub forest and cliffside forest; (5) Punta Arenas (18°04'54" N, 18°56'36" W; 0-5 m): coastal lowland forest with open canopy and successional habitats; and (6) Sendero Capitán (18°05'30" N, 18°56'10" W; 35-55 m), plateau forest (vegetation types according to Cintrón and Rogers, 1991). The main sampling methods included hand collecting, use of beating sheets at day and night, barking of fallen branches and trunks, and running Hg and UV vapor lights at night (typically 07:00-11:00 pm). The new records and natural history observations were supplemented with published information on Puerto Rican insects and their plant associations (e.g. Wolcott, 1941, 1948, Ramos, 1946, Martorell, 1976).

Synoptic sets of voucher specimens were deposited in the University of Puerto Rico at Mayagüez Invertebrate Collection (UPRM; Mayagüez, PR), the Charles W. O'Brien collection (CWOB; Green Valley, AZ), and the C. P. Gillette Museum of Arthropod Biodiversity (CSUC; Fort Collins, CO; specimens of *Scolytodes* Ferrari only).

The higher-level arrangement of families, subfamilies, tribes, and subtribes is alphabetical and in taxonomic accordance with Alonso-Zarazaga and Lyal (1999) and Anderson (2002: Platypodinae and Scolytinae). Unless otherwise stated, the adopted species names and concepts (cf. Franz *et al.*, 2008) are those of Valentine (2003: anthribids), O'Brien & Wibmer (1982, 1984) and Wibmer and O'Brien (1989: curculionids), and Bright and Torres (2006: scolytines). The habitus photographs were taken with a Microptics XLT imaging system. The sequence for providing distributional information is as follows: (1) localities on Mona Island; (2) occurrences outside of the Caribbean archipelago (west to east and north to south); (3) presence on islands within the Caribbean archipelago (west to east).

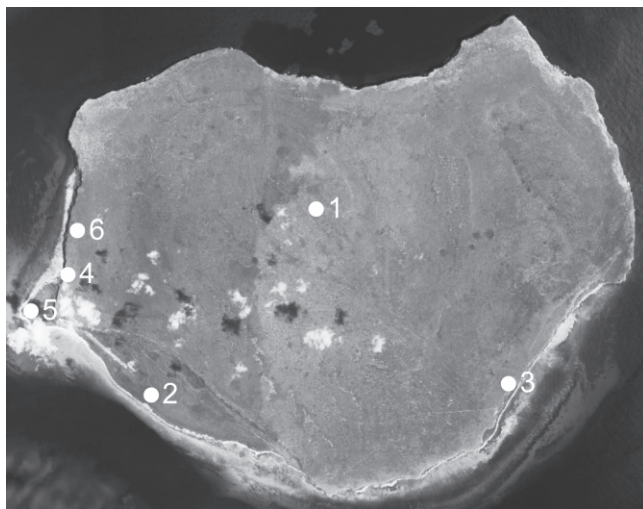


Fig. 1. Collecting localities on Mona Island, May 18-24, 2008. 1=Bajura Los Cerezos; 2=Playa (Sendero) Carabinero; 3=Playa Pájaros; 4=Playa Sardinera; 5=Punta Arenas; 6=Sendero Capitán. Image produced with Google Earth™ mapping service. See text for additional information.

ANNOTATED CHECKLIST OF THE WEEVILS OF MONA ISLAND, PUERTO RICO

ANTHRIBIDAE

ANTHRIBINAE Billberg, 1820

Platystomini Pierce, 1916**1. *Toxonotus* sp. nov.****Localities.** Playa Sardinera and Sendero Capitán; Hispaniola (Valentine, 2003).**Notes.** Collected on shrubs and trees at night. This species corresponds to "*Toxonotus* sp. 3" in Valentine (2003: 60) who identifies 5 new Caribbean species in the genus.**Zygaenodini Lacordaire, 1866****2. *Ormiscus* sp. nov.****Localities.** Punta Arenas; possibly Puerto Rico and other islands.**Notes.** Collected on shrubs and trees at night. This species corresponds to "*Toxotropis* sp." in Ramos (1946: 43). Valentine (2003) identifies more than 70 new West Indian species in this genus, yet apparently omitted this record from Mona Island. See also Martorell (1976).**BRENTIDAE**

CYLADINAE Schoenherr, 1823

3. *Cylas formicarius* (Fabricius, 1798: 174)**Localities.** Playa Sardinera; Old World, Haiti, Hawaii, New Mexico, Texas, Louisiana, Missouri, South Carolina, Florida, Belize, Guatemala, South America; Bahamas, Cuba, Jamaica, Dominican Republic, Puerto Rico, St. Croix (O'Brien and Wibmer, 1982, Turnbow and Thomas, 2008).**Notes.** The "sweet potato weevil" is likely associated with – now abandoned – sweet potato plantations (= *Ipomoea batatas* [Linnaeus] Lamarck, Convolvulaceae) in the southwestern lowland area of Mona Island (Wadsworth, 1973).**CURCULIONIDAE**

COSSONINAE Schoenherr, 1825

Cossonini Schoenherr, 1825**4. *Cossonus impressus* Boheman, 1838: 1019 (Fig. 2)****Localities.** Sendero Capitán; Florida; Bahamas, Cuba, Jamaica, Puerto Rico, St. Thomas (O'Brien and Wibmer, 1982, Turnbow and Thomas, 2008).**Notes.** Attracted to lights; likely in rotting wood (Wolcott, 1948, Martorell, 1976).**5. *Stenotrupis acicula* Wollaston, 1873: 603, new record****Localities.** Sendero Carabinero; Cuba, Hispaniola, Puerto Rico (O'Brien and Wibmer, 1982).**Notes.** Under bark of fallen tree branches along trail.**Rhyncolini Gistel, 1856****6. *Macrancylus linearis* LeConte, 1876: 339, new record****Localities.** Playa Pájaros; Hawaii, Baja California, Texas, North Carolina, South

Carolina, Florida; Bahamas, Grenada, Grenadines, Mustique (O'Brien and Wibmer, 1982, Turnbow and Thomas, 2008).

Notes. Under driftwood on beach.

CRYPTORHYNCHINAE Schoenherr, 1825

Cryptorhynchini Schoenherr, 1825

7. *Pseudomopsis cucubano* Wolcott, 1951: 404

Localities. Playa Sardinera and Sendero Capitán; Bahamas, Puerto Rico (O'Brien and Wibmer, 1982, Turnbow and Thomas, 2008).

Notes. Collected on shrubs and trees at night. The "cucubano seed weevil" is known to infest seeds of *Coccoloba* spp. (Polygonaceae) in Puerto Rico (Wolcott, 1948: 404-405, Martorell, 1976), and is thus likely associated with *Coccoloba wifera* Linnaeus on Mona Island (Woodbury *et al.*, 1977).

CURCULIONINAE Latreille, 1802

Anthonomini C.G. Thomson, 1859

8. *Anthonomus agerochus* Clark, 1991: 45, **new record**

Localities. Sendero Capitán; Florida; Dominican Republic (Clark, 1991).

Notes. Collected on shrubs and trees at night. See also Clark (1991).

9. *Anthonomus macromalus* Gyllenhal, 1836: 352, **new record** (Fig. 3)

Localities. Punta Arenas; Florida; Dominican Republic, Puerto Rico, U.S. Virgin Islands, Tortola, St. Barthélemy, St. Kitts, Antigua, Guadeloupe, Martinique, St. Lucia, Grenadines, Trinidad (Clarke and Burke, 1985, Hunsberger and Peña, 1997).

Notes. Collected on *Malpighia glabra* Linnaeus ("acerola"; Malphigiaceae). See also Clarke and Burke (1985).

10. *Anthonomus* sp. 1 (cf. Ramos, 1946: 44)

Localities. Bajura Los Cerezos, Playa Sardinera, Playa Uvero (18°03'33" N, 18°54'24" W; 0-5 m) and Sendero Capitán; possibly Puerto Rico and other islands.

Notes. Collected on herbaceous and shrubby plants; and attracted to lights. Wolcott (1936: 303-305) lists 24 putative species of *Anthonomus* Germar for Puerto Rico, including 18 unnamed morphospecies.

11. *Anthonomus* sp. 2, new record

Localities. Playa Pájaros and Sendero Capitán; possibly Puerto Rico and other islands.

Notes. Attracted to lights; see also above.

12. *Huaca apian* Clark, 1993: 17, **new record**

Localities. Bajura Los Cerezos and Playa Carabinero; Florida; Dominican Republic, Puerto Rico, Dominica (Clark, 1993).

Notes. Collected on shrubs. See also Clark (1993).



Figs. 2-4. Weevils of Mona Island. 2 *Cossonus impressus* Boheman; 3 *Anthonomus macromalus* Gyllenhal; 4 *Sibinia pulcherrima* Champion.

Tychiini C.G. Thomson, 1859**13. *Sibinia pulcherrima*** Champion, 1910: 191, **new record** (Fig. 4)

Localities. Punta Arenas; Puerto Rico (O'Brien and Wibmer, 1982).

Notes. Collected on herbaceous plants. See also Wolcott (1936) and Clark (1978).

14. *Plocetes dumosus* Clark, 1982: 60, **new record**

Localities. Sendero Capitán; Puerto Rico (Clark, 1982).

Notes. Attracted to lights. See also Clark (1982).

15. *Plocetes* sp. nov., new record (Fig. 5)

Localities. Sendero Capitán; possibly endemic to Mona Island.

Notes. Collected on shrubs and trees at night.

ENTIMINAE Schoenherr, 1823**Eustyliini Lacordaire, 1863****16. *Diaprepes abbreviatus*** (Linnaeus, 1758: 386) (Fig. 6)

Localities. Playa Sardinera; California, Texas, Florida (introduced); Hispaniola, Puerto Rico, Vieques, Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Barbados (O'Brien and Wibmer, 1982, Grafton-Cardwell *et al.*, 2004).

Notes. "Adults feeding on the young leaves of *Terminalia catappa*" Linnaeus (Combretaceae; Wolcott, 1941: 103). The "citrus root weevil" is widespread in the Caribbean and extremely polyphagous (e.g. Martorell, 1976, Simpson *et al.*, 1996).

Geonomini Gistel, 1856**17. *Apotomoderes* sp. nov., new record** (Fig. 7)

Localities. Bajura Los Cerezos and Sendero Capitán; endemic to Mona Island.

Notes. Collected on shrubs and trees primarily at night; and "on citrus" (= *Citrus* Linnaeus, Rutaceae; N. Virkki, specimen label information). *Apotomoderes* Dejean was previously considered monospecific and restricted to Hispaniola (O'Brien and Wibmer, 1982). The species from Mona Island represents the eastern-most record of this genus which is currently under revision by the senior author.

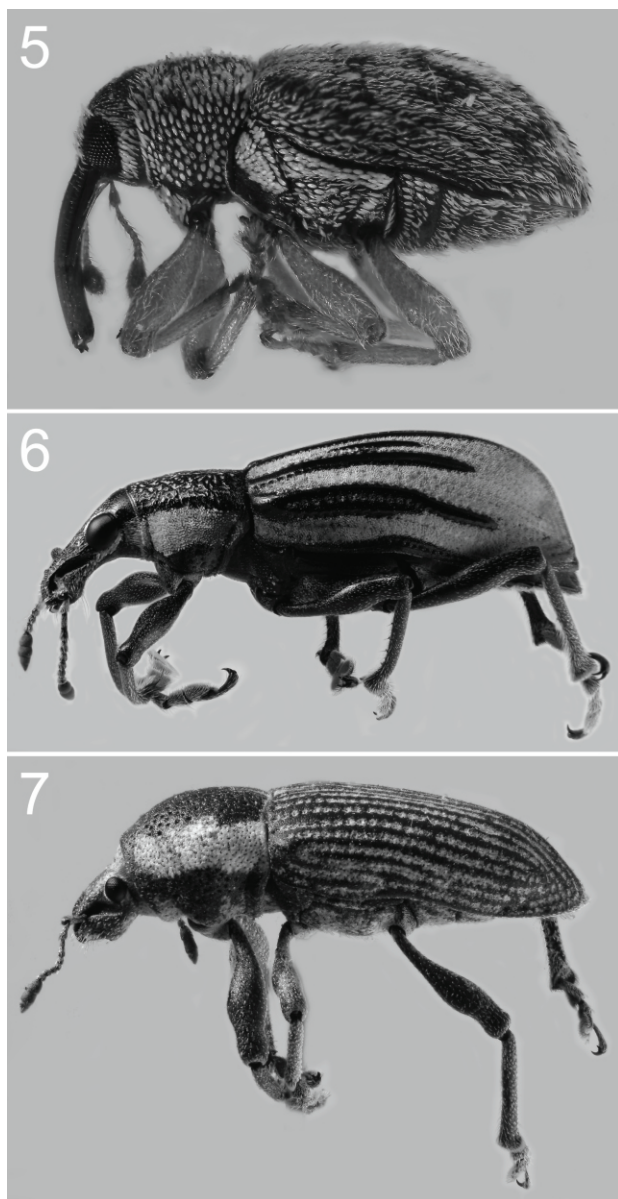
18. *Lachnopus kofresi* Wolcott, 1941: 104 (Fig. 8)

Localities. Sendero Capitán and Sendero Carabinero; endemic to Mona Island (O'Brien and Wibmer, 1982).

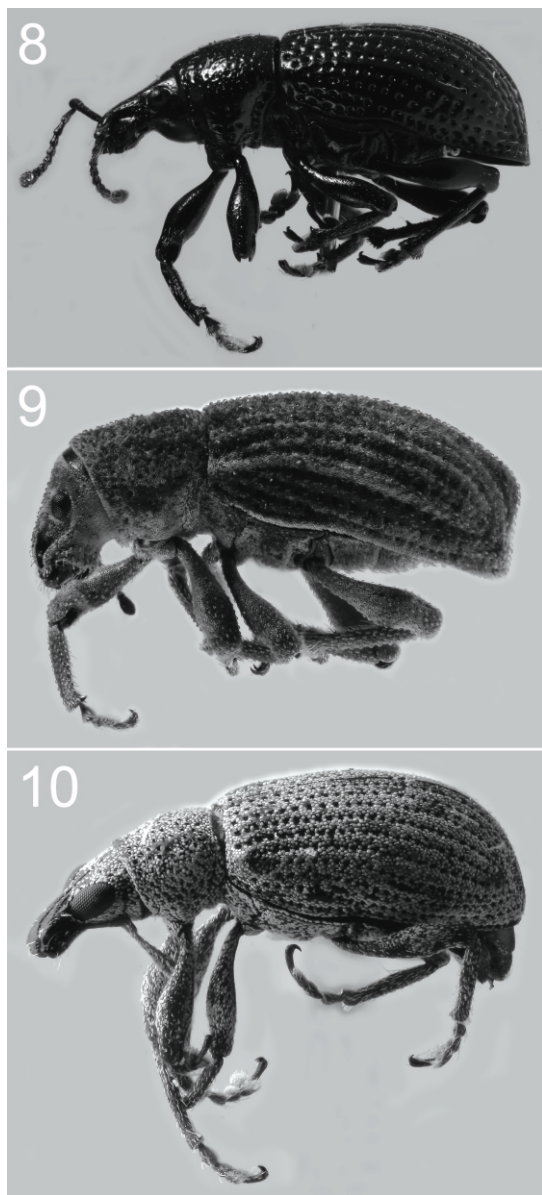
Notes. Collected on shrubs and trees; and "from the underside of leaves of cultivated eggplant" (= *Solanum melongena* Linnaeus, Solanaceae; Wolcott, 1941: 104). Phylogenetic studies indicate that this wingless, near-glabrous species is more closely related to *Artipus* Sahlberg than to *Lachnopus* Schoenherr (NMF, unpublished data).

Naupactini Gistel, 1856**19. *Artipus monae*** Wolcott, 1941: 102 (Fig. 9)

Localities. Playa Sardinera, Playa Uvero and Sendero Capitán; Puerto Rico (Wolcott, 1948, O'Brien and Wibmer, 1982).



Figs. 5-7. Weevils of Mona Island. 5 *Plocetes* sp. nov.; 6 *Diaprepes abbreviatus* (Linnaeus); 7 *Apotomoderes* sp. nov.



Figs. 8-10. Weevils of Mona Island. 8 *Lachnopus kofresi* Wolcott; 9 *Artipus monae* Wolcott; 10 *Apodrosus* cf. *argentatus* Wolcott.

Notes. Collected on shrubs and trees at night, including citrus trees; "on casuarina foliage [= *Casuarina equisetifolia* Linnaeus, Casuarinaceae] and eggplant leaves" (Ramos, 1946: 43); and "feeding on the leaves of *Amyris elemifera*" Linnaeus (Rutaceae; Ramos, 1946: 43).

Polydrusini Schoenherr, 1823

20. *Apodrosus cf. argentatus* Wolcott, 1924: 130 (Fig. 10)

Localities. Bajura Los Cerezos, Playa Pájaros (sea level and plateau), Playa Sardinera and Sendero Capitán; Bahamas, Dominican Republic (Parque del Este), Puerto Rico and Vieques Island (O'Brien and Wibmer, 1982, Turnbow and Thomas, 2008, NMF, personal observation).

Notes. Collected on a variety of shrubs and trees in the depression and plateau forests; "on shoots of *Colubrina colubrina*" Millspaugh (Rhamnaceae; Wolcott, 1941: 104); and attracted to lights. See Martorell (1976) for additional host records in Puerto Rico. Males and females of the Mona Island population differ slightly in genital characters in comparison to populations from Puerto Rico and the Dominican Republic, suggesting a longstanding reproductive isolation from the larger islands. The genus is under revision by Jennifer C. Girón (UPRM).

MOLYTINAE Schoenherr, 1823

Conotrachelini Jekel, 1865

21. *Conotrachelus* sp., new record (Fig. 11)

Localities. Bajura Los Cerezos; possibly endemic to Mona Island.

Notes. Collected on shrubs and trees.

Cycloterini Lacordaire, 1863

22. *Gononotus angulicollis* (Suffrian, 1871: 181), new record (Fig. 12)

Localities. Playa Pájaros; Florida, Mexico; Bahamas, Cuba, Puerto Rico (O'Brien and Wibmer, 1982, Turnbow and Thomas, 2008).

Notes. Collected under loosely attached bark of fallen tree branches near beach. See also Wolcott (1948).

PLATYPODINAE Shuckard, 1840

Platypodini Shuckard, 1840

23. *Euplatypus parallelus* (Fabricius, 1801: 284) (Fig. 13)

Localities. Playa Pájaros and Sendero Capitán; "carried through modern commerce worldwide in tropical areas" (Wood, 1993: 275).

Notes. Attracted to lights (plateau forest). Misidentified in Ramos (1946) and Wolcott (1948) as *Platypus rugulosus* Chapuis (cf. Wood, 1973). See also Wood and Bright (1992).

SCOLYTINAE Latreille, 1807

Scolytini Latreille, 1807

Cryphalina Lindemann, 1876

24. *Hypothenemus crudiae* (Panzer, 1791: 35), new record



Figs. 11-13. Weevils of Mona Island. 11 *Conotrachelus* sp.; 12 *Gononotus angulicollis* (Suffrian); 13 *Euplatypus parallelus* (Fabricius).

Localities. Sendero Carabinero; worldwide in tropical, subtropical and temperate regions; Cuba, Dominican Republic, Puerto Rico, Grenada, Trinidad (Bright and Torres, 2006).

Notes. Collected on shrubs and trees. See also Bright and Torres (2006).

Ctenophorina Chapuis, 1869

25. *Pycnarthrum hispidum* (Ferrari, 1867: 19), **new record**

Localities. Sendero Capitán; "[w]idespread throughout the West Indies; also from Central America, Mexico, and northern South America" (Bright and Torres, 2006: 396).

Notes. Attracted to lights. See also Bright and Torres (2006).

26. *Scolytodes* sp. nov., new record

Localities. Sendero Capitán; endemic to Mona Island.

Notes. Collected at lights. This species is presently being described by Donald E. Bright (CSUC). See also Bright and Torres (2006).

Scolytina Latreille, 1807

27. *Cnemonyx ficus* (Schwarz, 1894: 44), **new record**

Localities. Sendero Capitán; Florida; Bahamas (Atkinson, 1993, Turnbow and Thomas, 2008).

Notes. Attracted to lights. See also Atkinson (1993).

Xyleborina LeConte, 1876

28. *Xyleborus volvulus* (Fabricius, 1775: 454)

Localities. Playa Sardinera and Sendero Capitán; "[r]ecorded in the West Indies from Cuba, Jamaica, Puerto Rico, and Santo Domingo; also widespread throughout the tropical and subtropical regions of the world" (Bright and Torres, 2006: 419).

Notes. Attracted to lights. Misidentified in Ramos (1946) as *Xyleborus confusus* Eichoff (a junior synonym of *X. ferrugineus* [Fabricius]). See also Wolcott (1948) and Bright and Torres (2006).

DISCUSSION

The Mona Island inventory has uncovered 16 new records and, depending on the outcome of further taxonomic work, 5-9 putative new species of Curculionoidea. The number of weevil species recorded for the island now stands at 28, nearly three times the number reported in Ramos (1946). Of these, at least three species are exclusive endemics: *Apotomoderes* sp. nov., *L. kofresi*, and *Scolytodes* sp. nov. Six additional species may ultimately have the same status if future studies support their separate identities and narrow distributions; viz. *Ormiscus* sp. nov., *Anthonomus* spp. 1 & 2, *Plocetes* sp. nov., *Apodrosus* cf. *argentatus*, and *Conotrachelus* sp. In other words, as many as nine species (~32%) of the documented fauna are *potentially* endemic to Mona Island, although this number should be viewed cautiously given that distributional data for West Indian weevils are often the result of incomplete sampling rather than single-island endemism (see e.g. Turnbow and Thomas, 2008). Nevertheless, the relative contribution of potentially endemic species to

the island's weevil assemblage is significantly greater than in bees (0/13 species are endemics; Genaro and Franz, 2008), butterflies (1/53 species; Smith *et al.*, 1994), and termites (0/4 species; Jones *et al.*, 1995); yet it is comparable to that of spiders (10/52 species; Vélez, 1973).

On the other hand, Mona Island shares at least 15 species (~54%) with Puerto Rico, 12 species (~43%) with Hispaniola, 10 species (~36%) with the Bahamas, and eight species (~29%) with the Virgin Islands. The relative predominance of species from Puerto Rico is observed in other insect groups (Torres and Snelling, 1992, Smith *et al.*, 1994, Genaro and Franz, 2008). This pattern is commonly attributed to a wind asymmetry in the Mona Passage which tends to promote east-to-west colonization events (Smith *et al.*, 1988). Several of Mona Island's weevil species are widespread throughout the Caribbean region; including (1) species that infest cultivated herbaceous plants and trees (e.g. *C. formicarius*, *D. abbreviatus*, *E. parallelus*, *X. volvulus*), and (2) species that may inhabit driftwood (e.g. *C. impressus*, *S. acicula*, *M. linearis*, *G. angulicollis*).

The discovery of 16 new records of weevil species for Mona Island – relative to 12 preexisting records including only two records since Ramos (1946) – is perhaps remarkable if one considers that these results were based on a one-person/one-week sampling effort. Above all, the numbers seem to reflect past and present logistic obstacles to collect insect specimens on the island and subsequently obtain expert identifications. Chartered trips to Mona Island are costly and access to all its habitats requires special arrangement with the DRNA. During the 2008 field trip the northern and north-eastern regions of the *meseta* were not accessible to researchers. In short, one would expect that a comprehensive, spatially and temporally extended inventory of Mona Island weevils will yield many additional species (see also Torres and Snelling, 1992, Smith *et al.*, 1994, Genaro and Franz, 2008).

Challenging logistics notwithstanding, the island's weevil fauna is very depauperate (cf. Ramos, 1946), and possibly one order of magnitude smaller than the number of vascular plant species (Woodbury *et al.*, 1977). In contrast, the respective numbers of weevil and angiosperm species are nearly equivalent at a global scale (Oberprieler *et al.*, 2007). The xerophytic environment and short geological time period available for colonization (i.e., Pliocene-Pleistocene) are likely underlying factors for the low species diversity. The species' population densities appeared low as well; only one to ten specimens were obtained for most species, although no attempt was made to conduct a quantitative sample. The weevil fauna is furthermore taxonomically "disharmonious" and dominated by multiple species of Cossoninae (3), Anthonomini (5), Tychiini (3), Entiminae (4), and Scolytinae (5) which jointly constitute more than 70% of all recorded species. Many common Caribbean weevil lineages (cf. Wolcott, 1948, O'Brien and Wibmer, 1982, Pérez-Gelabert, 2008) are either underrepresented or absent; including Attelabidae, Apionidae, Dryophthoridae, Baridinae, Cryptorhynchinae, Molytinae, and Lixinae, among others (taxonomic concepts as in Alonso-Zarazaga and Lyl, 1999).

The preliminary presence/absence data offer some insight into the potential of different weevil lineages for longer distance (= 60 km) inter-island dispersal. The low number of cryptorhynchine species is particularly intriguing because this weevil subfamily is the most diverse in Puerto Rico. For instance, at least 20 species of Cryptorhynchinae occur in the Maricao State Forest along the western end of the Central

Cordillera (NMF and CWOB, personal observation). In contrast, the widespread *P. cucubano* is the only recorded species for the subfamily on Mona Island. This seemingly inverse pattern is not readily attributed to the island's xerophytic conditions. Indeed, there are many ecological similarities between Mona Island and the Guánica Dry Forest in southwestern Puerto Rico (Murphy and Lugo, 1990) which sustains a richer cryptorhynchine assemblage. Thus, the observed differences in species diversity suggest a poor ability to cross water barriers, and furthermore, that land dispersal during the Oligocene-Miocene period (~30-14 million years ago) via the Greater Antilles-Aves Rise ("GAARlandia" *sensu* MacPhee *et al.*, 2003, Iturralde-Vinent, 2006) was likely an important precondition to the arrival of cryptorhynchines and other aforementioned weevil lineages on the main island of Puerto Rico.

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